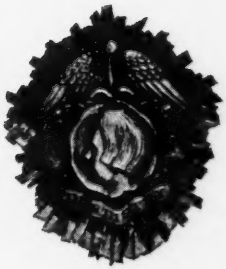
Journal of Dentistry for Children



THIRD QUARTER 1949

Journal of Dentistry for Children

PUBLISHED BY THE AMERICAN SOCIETY
OF DENTISTRY FOR CHILDREN

ALFRED E. SEYLER, D.D.S., F.A.C.D., *Editor*
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18th ANNUAL MEETING
AMERICAN SOCIETY OF DENTISTRY FOR CHILDREN

San Francisco, California **October 15th and 16th, 1949**

Official Headquarters — Whitcomb Hotel

PROGRAM

Saturday, October 15th
10:00 A.M.—Executive Council and Delegates from State Units.
President-elect Taub presiding.
(Article IV, Sec. 5, A.S.D.C. Constitution)

Saturday, October 15th
2:00 P.M. to 5:30 P.M. School of Dentistry, P & S.
Executive Council in Session.

Saturday, October 15th
7:00 P.M., Dinner, Palace Hotel.
Combined A.S.D.C.-American Academy of Pedodontics.
(Wives, Hygienists and Assistants are invited.)

Sunday, October 16th
9:30 A.M. to Noon. Auditorium, School of Dentistry, P & S.
Panel Discussion (see program elsewhere in this issue).

Sunday, October 16th
12:15 P.M., Luncheon, Whitcomb Hotel (see Bulletin Board for Room).
(Wives, Hygienists and Assistants are invited.)

Sunday, October 16th
1:30 P.M. to 5:30 P.M. School of Dentistry, P & S.
General Business Session and Election of Officers.

Sunday, October 16th
7:00 P.M., Dinner, Whitcomb Hotel.
Annual Meeting of American Society of Dentistry for Children
and American Association of Public Health Dentists.
Speaker: Dr. E. Rogers, Dean, University of California,
School of Public Health.

Developmental Problems of the Primary and Early Mixed Dentitions

EDWARD A. CHENEY,* D.D.S., M.S.
Lansing, Michigan

Editor's Note:

Ye Ed has a kindred point of view with Ed Cheney — both being rather sparsely possessed of hirsute adornment! But there the similarity ends, for Ed Cheney is a sober, industrious, part-time practitioner and research worker in orthodontics, while ye Ed is of a different school!

Dr. Cheney is a Michigander, born and educated within the State, graduating from the University of Michigan School of Dentistry, and teaching there since 1942 as a member of George Moore's Orthodontic Department. He is married, has one child, lives and practices in East Lansing, Michigan, and from what I learn, has practically no bad habits — although he does gourmandize over boiled shrimp with horseradish cocktail sauce, which his friend Chuck Lehman prepares so well!

This article, the first of two to appear in our Journal, is well written, and I'm sure that as you read it you'll find yourself pleasantly surprised at its practical approach to your own problems albeit it is scientifically written from the viewpoint of that paradoxical individual — a practicing research worker and good teacher!

A.E.S.

There are many opportunities for the prevention and interception of malocclusion and these services are important and necessary in the overall consideration of dentistry for children. They enable the guidance as well as the restoration of the developing dentition to its greatest possible function during the period when the teeth and jaws are most easily modified.

Until recently, the obligation for the early detection and interception of malocclusion has been left mostly to the orthodontist. Yet, by his virtual isolation in a limited practice, he is in a poor position to offer wide spread preventive orthodontic services. Too often the patient arrives for treatment after the opportunity for interception has passed. In view of these circumstances, then, it becomes readily apparent that the early recognition of malocclusion is the responsibility, not only of the orthodontist, but all dentists who attempt to serve the needs of children. It is the task of any professional group to contribute to the total welfare of the patient it serves. If we adopt this point of view, it then becomes the particular responsibility of the dentist to understand and to recognize the problems and conditions which interfere with the satisfactory development of the human dentition.

To a great extent the interception of malocclusion is also every dentist's responsibility. His willingness to practice this phase of dentistry depends, of course, on his interest, his allocation of practice time and his training in orthodontic procedures. Many dentists are pleased to recognize and refer all cases of this nature to the man who limits his practice to orthodontics. Others deal with minor developmental irregularities by means of simple treatment procedures, like the tongue blade for single anterior crossbites. Still others, like the pedodontist, because of a particular interest in the developmental as well as the restorative aspects of the primary and mixed dentitions do even further with guidance of growth and the interception of malocclusion. And some practitioners, by reason of their interest and training, limit their practices to orthodontics.

*Dept. of Orthodontics, University of Michigan.

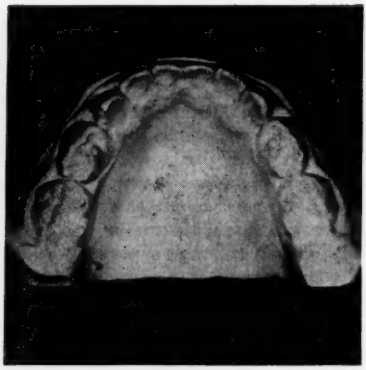
The development of a chain of responsibility, as is described above, is not now a clear cut reality. Far too many dentists are indifferent to the need of this service. Yet, there is currently a widespread acceptance of obligation and a growing interest in the early recognition and interception of malocclusion. There is also available an adequate body of knowledge about the growth and development of the face, jaws and teeth. This knowledge is fundamental to the understanding of the development of satisfactory and functional occlusions and their proper guidance. In addition, there is a multitude of techniques available for the prevention and interception of developmental irregularities. At present it is necessary to coordinate the pertinent information about the diagnosis of preventable malocclusions with the techniques available to intercept them and to pass this information on to all dentistry. It is the intent of this presentation to initiate a discussion of this type. The development of such information must take into account, however, that treatment, althought of great importance, is always secondary in consideration to the nature of the problem, and that even the timely referral of cases for treatment requires a knowledge of the fundamentals of occlusion and the biology of the growth and development of the human dentition. Moreover, in these considerations it seems only reasonable to recognize that the nature of the case rather than the type of treatment needed indicates the manner in which it can be handled best. Many conditions, by reason of extensive restorative as well as orthodontic needs can be cared for by the pedodontist or family dentist. On the other hand many cases are complicated in nature and require the particular considerations of a qualified orthodontist. In all situations there is need for continued advisement and consultation among and between dentists in order to give the patient the competent and qualified services now available from the field of dentistry. Cooperation of this type will serve to increase the value of the dental profession to the public it serves.

Anterior Crossbites

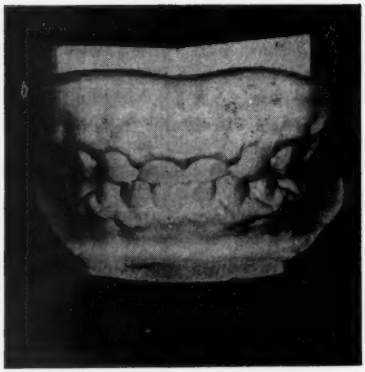
One of the more commonly observed of dental irregularities which may disturb potentially normal growth patterns is the crossbites. These conditions are observed both in the primary and in permanent dentitions. Crossbites may occur unilaterally or bilaterally, and may be found both anteriorly or posteriorly. Their significance and the need for correction depends on their influence and effect upon the developing dentition. At least three undesirable consequences can result from the presence of these irregularities. First, a crossbite may force the mandible into abnormal anterior or posterior closure habits during mastication, the growing facial structures may be directed into an asymmetrical pattern. Second, a crossbite may direct the teeth to erupt to the buccal, labial or lingual of positions they normally assume in the dental arches. The bone which grows to support the teeth in these abnormal positions is maldistributed and it is difficult to modify it once growth has ceased in the adult dentition. Third, because of the traumatric relationships incident to the cross bite there is often destruction of the crowns and supporting structures of the teeth involved. In the presence of these and other undesirable changes occuring as result of a crossbite it is indicated that the condition be removed immediately regardless of the age of the patient.

It is not always easy to determine the significance of a crossbite in the primary and mixed dentitions. The dentofacial form is only partially developed and the result of the irregularity has yet to be manifest. Yet the interception of malocclusion is most successful when initiated in the early stages of development. In view of this circumstance, it is imperative that we resort to diagnostic aids which enable the detection of a crossbite at a time when its treatment is most effective. There are several aids which are a particular importance in the evaluation of the condition under discussion. In order to limit the discussion the article will deal only with the diagnosis and need for treatment of anterior crossbites in the primary and early mixed dentition.

(a)



(b)



(c)

Figure 1. Photographs of casts illustrating the advantage of the closed bite examination.

There are in particular, two diagnostic aids which facilitate the early recognition and correction of undesirable anterior crossbites. The first of these may well be termed the closed bite examination. This technique is illustrated in figures 1a, 1b, and 1c. Figures 1a and 1b show occlusion views of the primary dentition of a four year old child. These photographs show well aligned maxillary and mandibular dental arches in good relationship to the supporting bone. Figure 1c illustrates the occlusion when the casts are articulated. The closure of the teeth in occlusion reveals a bilateral anterior crossbite. In view of the ideal alignment of the individual arches, this condition might well have been overlooked without the closed bite examination. If we are to recognize and intercept early anterior crossbites it is important, then, that this technique be a routine part of our examination procedures.

The closed bite examination enables other appraisals which are of importance in the general consideration of treatment and its possibilities. In addition to showing the relationship of opposing teeth in occlusion it permits an analysis of the relationship between the teeth and their supporting bone. When the jaws are inadequate to support all of the teeth in a well aligned manner the interception of malocclusion is a difficult if not impossible procedure. Lastly, the closed bite examination compares the relative size of the mandible to the maxilla. Teeth are but end points in dentofacial growth. When the mandible is actually larger than the maxilla and the lower incisors have been carried to a point anterior to the upper incisors the possibilities for correction are poor. When correction is possible, the prognosis is poor. The same comparison holds when the maxilla is underdeveloped and the maxillary incisors are lingual to their mandibular opponents because the jaw which supports them is small in relation to the mandible. It will be observed, however, that there are many combinations of jaw deficiency and tooth irregularity associated with the anterior crossbites. In general, in the primary and early mixed dentitions, whenever the possibilities for correction seem reasonable, it is advisable to attempt the change for what ever good it may do. In many cases the response will be surprising and the result satisfactory.

Other considerations are made possible by the closed bite examination. They deal with the factors of heredity and local influences. These factors may operate to stabilize or undo any beneficial change which can be made. The inherited potentiality of the patient is important when considering possibilities for treatment. Occasionally the presence of strong familial mandibular overgrowths on maxillary deficiencies contra-indicate the value of a crossbite correction. Once in a while the premature loss of teeth, the presence of habits and other local conditions make treatment an impossibility. However, again, in spite of all questionable variables it seems advisable, wherever possible, to correct the anterior crossbite of the primary and early mixed denition for whatever good it may do in directing the growth of the dentition to a satisfactory conclusion.

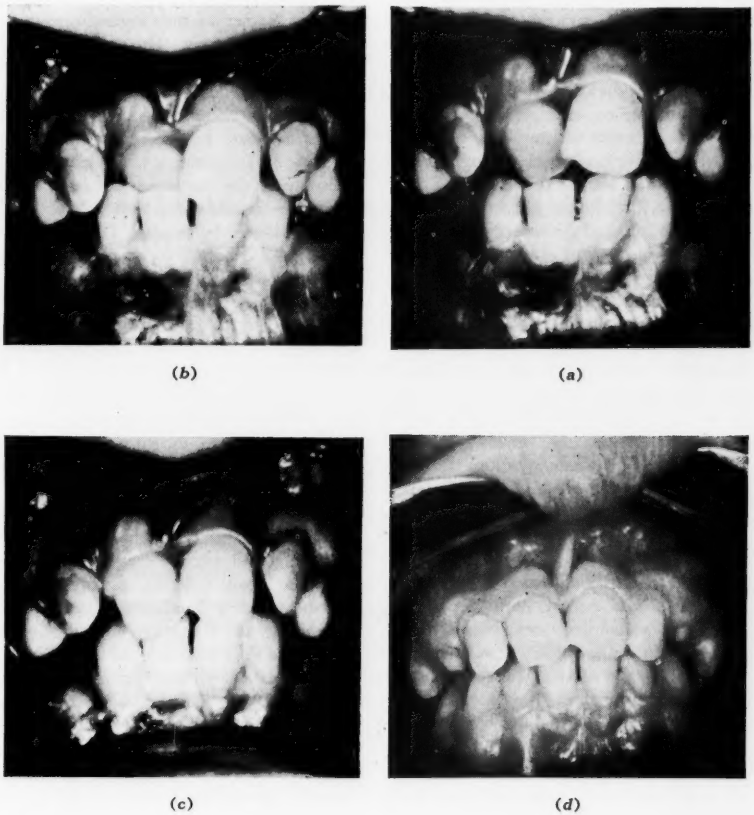
There appears to be but one definite contraindication to the interception of an anterior crossbite. Again this appraisal is enabled by the closed bite examination and is illustrated in figures 2a and 2b. We are constantly looking for several diagnostic signs when analyzing the in-locking of one or more maxillary incisors lingual to their opponents. The most important of these deals with the amount of shift that the mandible must make as it comes into occlusion in the presence of a crossbite. The clinical examination of the mouth of the child in figure 1 revealed that this four year old shifted her jaw slightly forward when coming into occlusion. Closure of the mandible in a most retruded or centric position resulted in an end to end bite of the incisors and posterior mastication was impossible. Here, because of malposition of the primary incisors, there was a forward shift of the mandible. In figure 2a, however, only the right central incisor is locked in lingual version. The clinical examination of this patient revealed that there was little or no shift of the mandible associated with the condition. There was merely malposition of the primary incisors. Because of the absence of a mandibular shift it was judged that with the exfoliation of the primary tooth and the eruption of the permanent one the elimination of the crossbite would take place. Figure 2b shows the same patient three years later. As predicted, the crossbite disappeared.

The amount of mandibular shift involved in a crossbite of the primary dentition is of important consideration. Only a small amount is needed to direct the succeeding permanent teeth into an inlocked relationship. When there is no mandibular shift associated with the primary cross bite treatment is contraindicated. Usually the permanent incisors will erupt into satisfactory occlusion. On the other hand, when a forward shift of the mandible accompanies the primary anterior crossbite, treatment is indicated with the hope that a sufficient change can be made to permit the permanent successors to erupt into their correct relationship.

(a) (b)

Figure 2. Photographs of casts illustrating a contra-indication for treatment. (a) Shows a crossbite of the primary dentition and (b) shows the permanent dentition three years later.

The second important aid in diagnosis is called "shifting of the jaws to a position of greatest occlusal advantage." Its use in the specific treatment considerations is mentioned in the preceding paragraph apropos of contra-indications for treatment in the primary dentition. The presence of "jaw-shift" merits further examination since it indicates favorable probability in the management of anterior crossbite. The application and value of this technique is illustrated in figures 3a, 3b, and 3c. Figure 3a shows the closed bite examination and the presence of a single incisor crossbite in the early permanent dentition. Figure 3b demonstrates that the patient is able to bite with the incisors in an end-to-end relationship—he was asked to establish this position by occluding his posterior teeth in a position of greatest occlusal advantage. For young patients, pushing against the chin helps to guide the jaw to a retruded position when it is possible for the mandible to make this change. It is the position of centric for the individual. That the patient can occlude with his incisors in an end-to-end relationship (figure 3d) gives an optimistic prognosis. In treatment both maxillary incisors and mandibular incisors can be positioned best to serve the needs of the patients; for example, by protruding the maxillary and retruding the mandibular. These changes when added to the distal mandibular shift speed the correction of anterior crossbites (figure 3c) and often enable the guidance of the erupted teeth. The great value of this diagnostic aid lies in the fact that it tests the operator's estimate of the relative size of the maxilla and mandible made during the closed bite examination. The unlocking of the teeth is indicated when the patient can bring his incisors end-to-end and when the jaws are of equal size. On the other hand when the patient cannot retrude the mandible enough to permit an end-to-end bite it usually signifies that there is a difference in the size of the mandible to the maxilla. Here the possibilities for a successful change are not as good. Occasionally the individual incisors are poorly positioned relative to their opponents and a mere "jumping of the bite" is out of the question. In either of the above situations the prevention and interception of malocclusion is unreasonable and treatment on this basis is contra-indicated. It suggests that more comprehensive modification of the dental arches with major orthodontics or even surgical intervention must be considered and probably involves consultation with a specialist.



(*b*) (*a*)

(*c*) (*d*)

***Figure 3.** Intra-oral photographs illustrating the "jaw-shift" examination. (a) Shows before, and (b) after the shift. (c) Shows incisor immediately after treatment and (d) shows it nine months later.*

In final consideration of the prevention and interception of anterior crossbites two topics warrant further discussion. The first centers about the maintenance of appropriate records. Orthodontic treatment differs from the operative and restorative phases of dentistry in that the placement of an appliance initiates rather than completes the service to be rendered. It is expected that a change in the relationship of the teeth will take place. In order to determine the direction and nature of these changes it is necessary to have complete records available for study. Accurate casts, or models, are of great value. These permit a close study of details not easily analyzed in the oral examination. In addition, they permit a comparison of the changes in the position of the individual teeth as treatment proceeds.

This appraisal is necessary to understand the amount of correction necessary in the guidance of growth. X-rays are of equal importance as a record provision since they add important evidence and permit a more correct analysis of the case. Figures 3a, 3b, and 3c offer an excellent example of the need for this type of examination. The correction shown here was made with a tongue blade. This technique will be discussed in a later article. The first attempt to correct the position of the inlocked incisor (figure 3c) was successful. However, in seven days the tooth had relapsed to its original position (figure 3a). A second attempt was also successful, but with subsequent relapse in three days. At this point in treatment it was judged advisable to take an X-ray of the area. The roetgenagram revealed the presence of a supernumerary tooth lying lingual to the root of the malposed central incisor. Following the removal of the supernumerary tooth treatment was immediate and stable. This experience serves to support the suggestion that whenever we move teeth within the bone we must know the character and condition of the structures adjacent to the roots and that X-ray diagnosis should not be omitted either in simple or in complex cases. Measurements of the overbite and overjet, as well as photographs of these relationships are also valuable aids in the prevention of malocclusion. A written report of the findings obtained during the initial examination and of opinions and possibilities considered at various stages of treatment are especially important in deciding upon the application of forces and the results obtained from them.

The second consideration deals with the extent to which treatment must be carried in the prevention and interception of malocclusion. In the primary and early mixed dentitions dentofacial development is far from complete. Rather it is only beginning to show itself in its final form. The modification of dental structures during these stages of growth, then, cannot be considered an end in itself. Treatment need be only those procedures necessary to direct and to continue the growing structures toward desirable relationships in the permanent dentition. Once the correct direction of growth is established treatment should be stopped. The case, however, should continue to be observed until the dentition is erupted and the dentofacial relationships are firmly established. This principle is well demonstrated in figures 3c and 3d. At the end of the initial unlocking of the incisor with a tongue blade (figure 3c) all other teeth were still out of occlusion. However, treatment was discontinued because the relationship of the incisor was considered sufficient to permit the forces of growth to take over. Figure 3d shows the same dentition nine months later. The incisor has been repositioned considerably by the forces of mastication and there is every reason to believe that it will continue to improve. The growth potential in this case was great enough to continue the correction once the initial "jump" had been made. On the other hand, if observation, had indicated that no change was taking place then treatment could have been continued as long as necessary. In the interception of crossbites, then, as in all other preventive orthodontic procedures, a minimum of treatment is indicated for the guidance of grwoth.

The next article will present some of the techniques available for the correction of anterior crossbites and consider the principles basic to treatment.

Attend the Panel Discussion

A.S.D.C. Meeting – San Francisco

JOINT MEETING

of

American Society of Dentistry for Children

and

American Association of Public Health Dentists

October 16, 1949 – Sunday – 9:30 A.M. to 12 Noon

Auditorium—College of Dentistry—P. & S.

PANEL DISCUSSION—"Problems Pertinent to the Practice of Pedodontics."
HUGO M. KULSTAD, D.D.S., *Program Chairman*

PARTICIPANTS

ORAL PATHOLOGIST—Herman Becks, M.D., D.D.S., Professor of Dental Medicine and Chairman of the Division, College of Dentistry, University of California; President, Annual Seminar for the Study and Practice of Dental Medicine.

NUTRITIONIST—Michael J. Walsh, M.Sc., F.R.I.C., A.I.C.I.E., Consulting Nutritionist, Author, Lecturer; Professor, University of Southern California, Postgraduate School.

PSYCHIATRIST—To be named at a later date.

ORTHODONTIST—George W. Hahn, D.D.S., Past President, California State Dental Association, Past President, Berkeley Dental Society, Assistant Clinical Professor of Orthodontics, University of California Dental College.

PEDIATRICIAN—Crawford Bost, M.D., Associate Clinical Professor of Pediatrics, University of California Medical School; District Chairman, American Academy of Pediatrics.

PEDODONTIST—Kenneth McKinnon, B.S., D.D.S., President, Marin County Dental Society; Director, Northern California Unit, American Society of Dentistry for Children; Instructor, Pedodontics, College of Dentistry, University of California.

PEDODONTIC EDUCATOR—Charles A. Sweet, D.D.S., Past President, American Society of Dentistry for Children; Diplomate, American Board of Pedodontics, Director of Postgraduate Pedodontic Department, College of Physicians and Surgeons Dental College.

MODERATOR

ALFRED E. SEYLER, B.S., D.D.S., F.A.C.D., President and Editor, A.S.D.C.

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Diet, Nutrition and Dental Caries

CARL L. SEBELIUS, D.D.S., M.P.H.*
Nashville, Tennessee

Editor's Note:

Carl Sebelius was born and raised in Kansas, in a small town called Almena. After graduation, in 1934, from Northwestern University School of Dentistry, he served two years in the U.S.P.H.S. at Marine Hospital, New York City. Since 1936 he has worked with the Tennessee Department of Health, having taken time out to obtain his M.P.H. degree at Ann Arbor in 1942. Carl is active in the affairs of the A.A.P.H.D., and the Tennessee Dental Association, and when a job is assigned to him, he really goes to work to get it done.

This accompanying paper was presented before the Dental Health Section of the A.P.H.A. at Boston, and is being presented to you as a fine discussion of the subject.

A.E.S.

Each of these words, diet, nutrition, and dental caries, needs to be carefully defined before a discussion of the relationship of each to the other is attempted. Diet may be described as the food which we eat, and nutrition, the utilization of food by the body. If the above two rather simple definitions are acceptable, then it seems that most of our discussion will be directed primarily toward the relation of diet to dental caries since it is most commonly thought today that dental caries is initiated by the local environmental substances which are found in the mouth. The following definition of dental caries was agreed upon at the University of Michigan Workshop,[1] held to evaluate dental caries control techniques:

> **"Dental caries is a disease of the calcified tissues of the teeth. It is caused by acids resulting from the action of micro-organisms on carbohydrates, is characterized by a decalcification of the inorganic portion and is accompanied or followed by a disintegration of the organic substance of the teeth. The lesions of the disease predominantly occur in particular regions of the teeth, and their type is determined by the morphologic nature of the tissue in which they appear."**

May I repeat that dental caries is caused by acids resulting from the action of micro-organisms on carbohydrates.

It can be said that commercial propaganda and misstatements have created so many misconceptions in the minds of so many people in regard to why teeth decay that many people no longer know what to think. No wonder the public, the dental and medical professions do not get a clear cut picture of the causes of dental caries when in many lay and professional magazines there are carried vivid descriptive full-page advertisements in regard to the important place that candy has in our present day diet. To bring out this point, the following was recently read in a dental trade magazine[2] which has a circulation of over 69,000 copies per month and is received by almost every dentist in the United States. The title of this bit of information directed to the dentists was as follows: "On the Dual Value of Candy." Since the content, contained below these title words, is somewhat similar to that found in other magazines, it is well worth reading:

> **"Socially candy has long been accepted as a pleasant part of our daily lives. From early childhood on, candy is considered an appropriate accompaniment of the festive spirit of birthdays, holidays, anniversaries, and other joyous occasions.**
>
> **"In recent years, with the advancing knowledge of nutrition, the value of candy as a worth-while part of the daily diet has become recognized. Most of the kinds of candy manufactured today are made of a number of valuable foods which contribute to the extent they are used to the satisfaction of many nutritional needs.**

*Director of Dental Hygiene Service, Tennessee Department of Public Health.

"The candies, in the manufacture of which milk, butter, eggs, fruits, nuts or peanuts are used, to this extent also (a) provide biologically adequate proteins and fats rich in the unsaturated fatty acids, (b) present appreciable amounts of the important minerals, calcium, phosphorous and iron; (c) contribute the niacin, and the small amounts of thiamine and riboflavin, contained in these ingredients.

"Whether enjoyed as a delectable tidbit during a friendly gathering—or served at the end of a family meal—or eaten as a quick energy food following strenuous activity, candy has a unique and valid place in the human dietary."

It seems that it is most easy for a person to become confused. Not once was mention made that refined sugar is used in the manufacture of candy and that candy usually runs from 75 to 85 per cent sugar. Popular candy bars are likely to weigh from one ounce to two ounces and may contain five or more teaspoonfuls of sugar.

The following comment has been taken from a letter recently received from a professor of biochemistry at one of the outstanding medical schools in the United States:

"I am delighted to see you take the candy ads to task. I think you might well make a considerably stronger statement concerning the emphasis which these ads place on milk, butter, eggs, fruits, nuts, etc., and the supply of nutrients carried by these ingredients. Obviously, these nutrients and foodstuffs are of very minor importance in the candy so far is nutrition is concerned. Further, I believe, if one is going to incriminate sugars, one should not limit the attack to candy. Certainly, many of the cakes, soda fountain desserts, sundaes, and cold drinks are equally deleterious."

Certainly the above remarks mean far more than the printed material found on page XII of the February, 1948, issue of the Journal of the American Public Health Association under the descriptive title, "When a Bit of Candy Means so Much."

It is known that dental caries, an almost universal disease, is caused by acids resulting from the action of micro-organisms on carbohydrates and that glucose is one of the most fermentable of the carbohydrates. Then we read in a dental magazine that candy has a unique and valid place in the human diet — what should we think?" What should we think when dental caries rates during the war in malnourished Italy, Holland and Norway were extremely low while they were exceptionally high in the United States among our own children? Recently a speaker stated that nutrition does not present a picture in the control of dental caries, that an inadequate diet is more apt to reduce dental caries than an adequate diet and that a person needs good nutrition if he has or does not have teeth. Now let's consider nutrition and its relation to the development of teeth.

Nutrition and Tooth Development

It must be remembered that once the enamel is completely formed it has no blood supply, and therefore, the enamel cannot receive an appreciable amount of nourishment from the rest of the body. Similarly, it is well to remember that the crowns of all permanent teeth, with the exception of the third molars, are calcified at the average age of eight, that the crowns of the first permanent molars are calcified at the age of three and that the country over the embryologists and physiologists have wondered how nutrition can improve enamel once the cells that laid it down are lost. It is also of importance to state that radioactive isotope ions only feebly penetrate the enamel. Only during tooth formation can nutrition have an appreciable effect upon the structure of the enamel.

Taylor and Day,[3] in 1940, further demonstrated the inability of enamel to change once it has been formed. In a group of twenty-one women who had decalcification of the bone which had occurred as a result of osteomalacia, the teeth were found nearly perfect. Kronfeld[4] also stated that calcium withdrawal or true decalcification of the adult human teeth has never been demonstrated.

It has long been an accepted fact that an optimal diet is of great importance during pregnancy, both for the mother and the fetus. The relation of the mother's diet before birth to the child's teeth can be seen from sources such as Gordon,[5] Mill, Bill and Kinney,[6] and Ziskin and Hoteling.[7] Hess, Lewis and Roman,[8] after many chemical and x-ray studies of teeth of infants from birth onward, have made the following conclusions: (1) Calcification of the teeth must be regarded as important only after birth; (2) At birth only a half

gram of tricalcium phosphate has been laid down in the teeth and the early years after birth are the periods of greatest significance in regard to calcium and phosphorus requirements of teeth; and (3) As far as the teeth of the infant are concerned, it cannot be of great importance whether throughout pregnancy a woman has a diet high in calcium and phosphorous, as she has bounteous storehouses of these substances in her bony skeleton.

What about the role of vitamins and minerals during tooth development? The following conclusions were agreed upon at the Michigan Workshop[1]: (1) Chronic mild deficiencies of vitamin A have no significant effect on the structure of the hard tissues or the shape of the teeth. However, chronic severe deficiencies of vitamin A produced characteristic abnormalities in the structure and form of the enamel and dentin of developing teeth of animals; (2) There is no evidence in the literature that a deficiency of vitamins B and C have an effect upon the developing teeth of man; (3) It has been rather clearly demonstrated that vitamin D is of value in the formation of the hard dental structures including the teeth themselves, and there is evidence to suggest the possibility of increased susceptibility to caries in teeth which have been formed during a condition of vitamin D deficiency; and (4) In regard to the intake of minerals, there is sufficient evidence in literature to justify the view that the ingestion of calcium and phosphorus in amounts sufficient to prevent skeletal defects will be adequate for the formation of teeth with normal composition and structure in the average well child.

Fluorides found in waters and foods no doubt show the most promise as a means whereby the ingestion of an element during tooth development may serve in turn as a partial protection against the caries process.

The Caries Process

The concept that dental caries is caused by acids formed by carbohydrates acted upon by enzymes produced by micro-organisms in the mouth is not a new one, but the process is complex because of the many variables. According to Fosdick[9] the degradation of carbohydrates to lactic acid follows a series of reactions. It has been found that certain microbial enzymes cause the process to take place faster than others. Fosdick suggests that organisms such as the lactobacillus and yeast may have a symbiotic relationship in this respect. There must, however, be carbohydrates in the diet before the process of caries is possible. The fermentable sugars are most readily broken down to lactic acid while an additional chain of reactions is required for the starches. There always must be an adequate enzyme or co-enzyme system present.

Other variables which are most important in the picture of dental caries are the self-cleansing ability of the teeth and the amount and buffering power of the saliva. The anatomic characteristics of the teeth and their position or arrangement in the dental arch are most important. Hereditary characteristics probably play more of a part in the form and position of teeth than the nutrition received by the tooth during development.

Diet and Dental Caries

A most important factor in the caries process is how frequently sugars are taken into the mouth. In an investigation conducted by Stephan and Miller[10] it was noted that when a ten percent glucose solution was used as a mouth rinse for two minutes, there was a rapid drop in pH and that the drop might remain for an hour or more. Thus a child who consumed refined sugars at intervals throughout the day would have more caries than the sporadic eater if the other variables were similar.

It is impossible to discuss the many variables which may influence the caries process. There are inhibitory factors[11] present in the mouths of caries-free individuals which are antagonistic to the lactobacillus. In such mouths the micro-organism will not grow regardless of the sweets consumed. When millions of these organisms are fed to such persons, within a few hours, their saliva is found free of the lactobacillus. It is thought that few people possess an immunity to dental caries. The ability of the oral flora of these individuals to change carbohydrates to acid is much less.

The dietary control method, where there is a strict control of carbohydrates, has been proven to be effective in the control of dental

caries. Sherman and Lanford[12] state that high intakes of protective foods and a low consumption of sugars are both important measures to follow if one is trying to prevent caries. It must be remembered that Boyd and Drain[13] recommended an adequate diet and that they first observed arrested dental caries in hospitalized children on diabetic diets which were, of course, exceedingly low in sugar.

Christie[14] states that it is possible and quite practical, from a nutritional standpoint, to produce a completely balanced diet which is entirely free from sugars, jams, jelly, ice cream, cakes and syrup types of carbohydrate for any age group.

From the observations made by Steffanson[15] he concludes: "The only thing that matters greatly with regard to the health of the teeth is the chemical composition of the diet —the higher the percentage of carbohydrates and the lower the percentage of animal proteins and fats, the greater the tooth decay."

Summary

1. Dental caries is a disease of the calcified tissues of the teeth caused by acids resulting from the action of micro-organisms on carbohydrates. The process is most complex because of the many variables involved.

2. Commercial propaganda should be critically studied before being followed.

3. Calcium withdrawal has not been demonstrated after the teeth have formed.

4. Nutritional status does not seem to have a significant bearing on the caries process.

5. It has been demonstrated that vitamin D is of value in the formation of the hard dental structures including the teeth themselves, while the existing intakes of vitamins A, B and C within the United States probably have no significant effect upon the development of teeth in man.

6. The ingestion of calcium and phosphorus in amounts sufficient to prevent skeletal defects will be adequate for the formation of teeth with normal composition and structure in the average well child; however, it is true that calcium and phosphorus metabolism is far from being completely understood at this time.

7. Fluorine no doubt shows the most promise as a means whereby the ingestion of an element during tooth developmeent may serve in turn as a partial protection against the caries process.

8. The restriction of sugar, either refined or natural, is effective in the control of dental caries.

9. A person susceptible to dental caries who ingests refined sugars throughout the day will have more caries than the sporadic eater if the other variables are the same.

10. Children should eat a protective diet to promote normal growth and development, not to prevent dental caries. The sugars should be kept low to help control dental caries.

Conclusion

In conclusion, from the information gathered in regard to diet, nutrition and dental caries, the following appropriate slogan might well be adopted:

"EAT A PROTECTIVE DIET TO PROMOTE NORMAL GROWTH AND DEVELOPMENT; KEEP THE SUGARS LOW TO HELP CONTROL DENTAL CARIES."

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Current Effort to Control Dental Caries*

WALTER J. PELTON, D.D.S., M.S.P.H.

Editor's Note:

Handsome Jack Pelton is an A.S.D.C. member from 'way back when he was taking his M.P.H. work at the University of Michigan.

Now in charge of the U.S.P.H.S. Dental program in the Rocky Mountain and Western Districts, Jack lives at Denver, Colorado. He has developed into a true Westerner, in that he has no regard for distances, drives his automobile fast, and drinks his bourbon with branch water! But he's still the same likable fellow we knew back when he attended the meetings of our Michigan Unit.

This article is on a subject dear to Jack's heart, and I've an idea you'll find it extremely interesting and informative.

A.E.S.

With pardonable professional pride and a great deal of satisfaction, we can now relegate to antiquity that qualifying phrase that once prefaced health education literature. That phrase invariably began: "We do not know the cause of decay *but . . .*"

Until ten years ago we were rich in empiric knowledge and theory. Today, that knowledge and that theory have crystallized into scientific facts.

Only through scientific study and sincere, painstaking efforts have we been able to accept W. D. Miller's theory of dental decay expressed nearly 60 years ago. His words parallel in thought the words we use today in describing dental caries. We say of dental caries now:

"It is a disease of the calcified tissues of the teeth. It is caused by acids resulting from the action of micro-organisms on carbohydrates and is characterized by a decalcification of the inorganic portion and is accompanied or followed by a disintegration of the organic substance of the tooth. The lesions . . . predominantly occur in particular regions of the tooth and their type is determined by the morphologic nature of the tissue in which they appear."[1]

Today we do not need to venture to assume, we can specifically state: "Scientific reports reveal that sickness, general health or nutritional status have no significant bearing on the caries process."[2]

We can say that "pregnancy and lactation in themselves are not a cause of dental caries. — Clinical studies indicate that pregnant women do not have a higher rate of caries than do non-pregnant women."[2]

In short, the past ten years or so has seen dental health develop from an after-thought in public health programs to one of the major activities. Much of the progress is due to the development of a relatively simple measuring device, the so-called DMF rate.

The basis for measuring dental caries experience has been by a simple count of teeth showing dental caries, past or present, at the time of examination. The terms caries, experience rates, caries attack rates, caries prevalence rates, as generally used, are synonymous with DMF rates. The symbol DMF indicates decayed, missing, or filled permanent teeth, each tooth being counted only once. When a summation of DMF teeth is expressed per child or per 100 children the figure becomes a rate which is meaningful only when expressed for specific age groups.[3]

Using the basic principles of DMF rates, Knutson has developed a rapid method of evaluating dental programs which requires a great deal less time than the detailed dental examinations previously needed to obtain DMF rates.[4] These very useful tools have giv-

*Presented at General Session of the A.P.H.A., Southern Branch, April 15, 1949, Dallas, Texas.

en us the mechanical and statistical crutches so useful to research and public health projects. Vague generalizations like "we feel, it seems, in our opinion" now have little place in our statements regarding dental health.

Accurate knowledge and definite statements like "teeth are decaying at a rate 6 times faster than they are being filled" is understandable to appropriating bodies and we now have the ability to gather the necessary statistics for such accurate knowledge.

In addition, other scientific devices such as the saliva tests for caries activity have aided also.[5] It is through these, then, that some of the control measures have been developed and are now being applied in dental health programs.

A quick review of the current status of dental caries control measures indicates that the restricted carbohydrate diet, developed by the Michigan group and substantiated by other competent investigators, can control dental caries when prescribed and followed diligently.[5] Although this procedure is scientifically sound and, therefore, should be employed by dentists as extensively as circumstances permit, its success depends on securing the continuing cooperation of the patient in the elimination or reduction of his intake of carbohydrates, principally sugars. Obviously, a public health approach using this technic offers little hope of success and efforts along these lines have not been extensive enough to cause a significant reduction in dental caries in the general population. Trying to convince the public that better dental health results from a reduction in carbohydrates is like trying to promote the idea that Junior will enjoy Christmas much more by giving presents rather than by receiving them.

The overwhelming mass of epidemiological data relative to the correlation between fluorine in public water supplies and the low prevalence of dental caries has stimulated much research and many projects.[6] The finding that children who throughout life have depended on water containing one or more parts per million of fluorine for drinking purposes have from 50 to 65 percent less dental caries than children using fluoride free waters has led to proposals that fluorides, in optimal amounts, be added to public water supplies as a partial prophylactic measure. About 14 such projects are now under way. In Wisconsin alone three cities are adding fluorine to their public waters and at least 30 more communities in that state are either installing the equipment to treat their water or have ordinances under consideration for that purpose.[7]

The subject of fluorine has been the topic of several important recommendations by the State and Territorial Health Officers Conference with the Surgeon General. For instance, in 1946 the Committee on Hospitals and Medical Services[8] of that body recommended that:

"State Health Departments institute demonstration programs concerned with: (a) The application of measures for the prevention of dental diseases."

This broad statement was interpreted by the Chairman of the Committee to mean it "to apply to the fluorination of water." . . .

Again in 1947 the Committee called attention to the evidence regarding the favorable relationship of small amounts of ingested fluorides during the "first 12 years of life" to dental caries. In addition, the Association of State and Territorial Health Officers[9] went on to recommend that:

"State Departments of Health promote the development of effective programs through which the partial caries prophylactic measure, topically applied fluorides, is made available to children, and that federal grants-in-aid, general health, be augmented so as to provide financial assistance in the development of such programs."

Last year, 1948, the State and Territorial Health Officers[10] said "that all public health dental programs should include the topical application of sodium fluorides as a prophylactic measure."

In the meantime, perhaps you are aware, that Congress did make funds available to the Public Health Service to conduct a nationwide topical fluoride demonstration program.[11] On July 1, 1949, the program to assign teams to the states requesting them, got under way. Demonstration teams, consisting

of a dentist, two hygienists and a clerk, supplied with portable equipment and an automobile, have been assigned to 34 states at the present writing (April, 1949). The purpose of the teams is to demonstrate the technical and administrative phases of the topical applications of sodium fluoride, to serve as a training mechanism and generally publicize and promote interest in the procedure. One of the objectives is to teach the method of application exactly as used in the clinical research studies. Four treatments, the first preceded by a cleaning of the teeth are spaced at once or twice a week and given when the child is 3, 7, 10 and 13 years, is the basic program.

The tremendous interest of parents and school authorities in this truly preventive procedure, which has been adequately tested and shown to reduce the incidence of new caries by at least 40% has been most amazing. The dental profession has been a great help in promoting the procedure and has recommended that "fluoride therapy should be used routinely in private dental offices and in school and community health programs."[12] In addition, the Dental Section of the APHA and the National Congress of Parents and Teachers as well as the State and Territorial Health Officers have lent their support to the program.

Efforts to halt the ravages of caries by the application of drugs to the exposed surfaces of the teeth are not new. In the past, silver salts have been used with, and without, the use of wetting agents and the conclusion has been reached that the topical application of silver nitrate has not been adequately shown to reduce or retard the progress of dental caries.[13]

Similarly, the use of other compounds for treating the crowns of teeth, such as "the impregnation method" of preventing dental decay which was recently publicized in one of the popular magazines, has not been approved by the American Dental Association because of the lack of adequate clinical evidence to either prove or disprove the claims made for the technic.[14]

A word should be said here about home methods for controlling decay—tooth brushing, dentifrices, mouthwashes, tablets and lozenges. First of all, it has been demonstrated[15,16] that when free sugar is placed in an open carious lesion or in a so-called caries susceptible area, the pH drops (acidity increases) to levels as low as 4.0 in three minutes. This suggests that most damage is done during or shortly after meals. The present timing of our tooth brush habits is not in conformity with these observations, nor does it seem practical to assume that authorities on etiquette will sanction conformity in the near future. Be that as it may, the possibility that tooth brushing per se may reduce the incidence of dental caries can not be ignored.

Kesel and others[17] obtained a marked reduction in oral lactobacilli counts (a laboratory test for caries) by incorporating dibasic ammonium phosphate and urea in a mouth wash and a dentifrice. Two such dentifrices have been approved by the Council on Dental Therapeutics of the American Dental Association for clinical trial.[18] Another company has changed the patented formula by adding a great amount of urea and thus is not marketing the product which the preliminary studies used. There is no evidence to draw any conclusions in regard to the special benefits which any of the ammoniated dentifrices may give.

Preliminary reports[19] published on the studies of the use of penicillin incorporated in a dentifrice indicate inconclusive results and thus present information is not sufficient to warrant the general use of the compound. The clinical experience of Hill[20] and his associates who are working with this drug seem encouraging.

Synthetic Vitamin K has anti-bacterial properties and preliminary studies on the use of this quinone as a caries prophylactic in humans appear successful. The evidence to support the claims for Vitimin K incorporated in chewing gum is sufficient to encourage further controlled research.[21]

Limited experience with fluoride mouthwashes has not given promise of results for general home use.[22] Neither do the experiments with fluoride tooth polishing pastes appear to offer promise.[23] While on the subject of other uses of fluorine it must be said that studies on the daily supplements of fluorine in capsule or tablet form for children under

eight years are not sufficiently advanced to warrant conclusion regarding the value of this method. Daily ingestion of small doses of fluorides in children under eight might be shown to have the same effect on teeth as occurs when children are reared in natural areas. On the basis of the epidemiological studies it is highly doubtful that ingestion of daily supplements of fluorine will be effective in adults. Arnold suggests daily medication in selected cases.[24]

Summary

An over-all review of the present status of preventive procedures for caries prophylaxis leads to the following summary conclusion:

It has not been established that any one of the vitamins which may be associated with deficiency diseases can be advocated either in optimal amounts or as supplements to the dietary to prevent dental caries. Drastic restriction of refined carbohydrates consumption is associated with a reduced incidence of dental caries. With the exception of fluorides, the minerals cannot be recommended as supplements to the diet with the assurance that caries will be prevented to any appreciable degree.

The most promising outlook at present for the partial control of dental caries appears to be in the field of fluorides. It has not yet been demonstrated that the artificial fluorination of communal water supplies is associated with a reduction in caries incidence. The evidence, however, is convincing that such an association does exist, because when fluorides occur as a natural constituent of the water supply, there is 50 to 65 percent less dental caries. That caries incidence can be reduced through the use of topical fluorides has been demonstrated. The manner of using topical fluorides to obtain optimal results with the minimum number of applications has been determined. Investigations and demonstrations of other topical agents such as penicillin, urea and ammonia nitrogen producing compounds, Vitamin K and other quinones, and silver nitrate appear to offer promise. At this time, however, no one of these can be advocated for general use as a procedure for preventing caries.

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American Academy of Pedodontics

Scientific Program: San Francisco, Calif., October 14-15, 1949
College of Physicians and Surgeons, Postgraduate Division

EVALUATION OF CLASS TWO AMALGAM RESTORATION TECHNICS FOR INCIPIENT CAVITIES IN PRIMARY MOLAR TEETH

FRIDAY, OCTOBER 14

8:30-9:15 Registration with Secretary

9:15-10:45 Essential Histo-chemistry of Primary Molar Teeth (Pulp, Dentin, Enamel)
Dr. James Nuckolls

10:45-11:45 Morphology of the Primary Molar Teeth . . . . . Dr. Carl . Ellertson

12:50-1:00 Registration with Secretary

1:00-1:50 Maxillary 1st Primary Molar: Operative Procedures for Class Two Amalgam Cavity Preparation (DO and/or MO), Toilet, Matrix Selection and Adaptation, Amalgam Manipulation, Condensation, and Finish
Dr. H. K. Addelston

1:50-2:20 Group Discussion (30 minutes)

2:20-3:10 Maxillary 2nd Primary Molar: Operative Procedures for Class Two Amalgam Cavity Preparation (MO and/or DO), Toilet, Matrix Selection and Adaptation, Amalgam Manipulation, Condensation and Finish
Dr. Alfred E. Seyler

3:10-3:30 Group Discussion (20 minutes)

3:30-4:20 Mandibular 1st Primary Molar: Operative Procedures for Class Two Amalgam Cavity Preparation (DO and/or MO), Toilet, Matrix Selection and Adaptation, Amalgam Manipulation, Condensation and Finish
Dr. Charles A. Sweet

4:20-4:40 Group Discussion (20 minutes)

4:40-5:30 Mandibular 2nd Primary Molar: Operative Procedures for Class Two Amalgam Cavity Preparation (MO and/or DO), Toilet, Matrix Selection and Adaptation, Amalgam Manipulation, Condensation and Finish
Dr. Geo. W. Teuscher

5:30-5:50 Group Discussion (20 minutes)

SATURDAY, OCTOBER 15

9:00-9:15 Registration with Secretary

9:15-12:00 Ten Minute Reviews:

Dr. Lyle S. Pettit: The Histologic Implications for the Class Two Cavity Preparation in Primary Molar Teeth

Dr. Henry M. Wilbur: The Morphologic Implications for the Class Two Cavity Preparation in Primary Molar Teeth

Dr. W. W. DeMeritt: The Implications of Mechanical Stresses for Class Two Cavity Preparations in Primary Molar Teeth

Dr. Ralph Ireland: Evaluation of the Various Operative Procedures Presented Previously on the Basis of:

(1) Their simplicity of performance.
(2) Their consideration for living tissue and morphology of the teeth.
(3) Their consideration of mechanical stresses.
(4) Their consideration of the physical properties in the manipulation of the amalgam.

Chairman: Summary of controversial points and areas of research needed, followed by group discussion and adoption of a set of scientific principles for Class Two amalgam restoration technics for incipient caries in the primary teeth.

1:00-3:00 Business Meeting

Joseph T. Hartsook, Program Chairman
Elsie C. Schildwachter, Secretary
6831 Seville Ave.
Huntington Park, California.

AROUND THE COUNTRY

Paul Taylor of our Texas Unit spoke on Dentistry for Children before the Fort Worth District Dental Society May 9th. Doctors Simmons and Kendall discussed his very interesting presentation .*(Ed. note to membership committee, Texas Unit—better sign up Simmons and Kendall to membership!!)*

★ ★ ★

Floyd Hogeboom of California was one of the featured speakers at the 1949 Texas State Dental Meeting, performing in his usual capable and interesting manner.

★ ★ ★

That Sweet family, of San Francisco, is still active on the lecture circuit, Charlie appearing at the April meeting of the Sacramento District and again at the California State meeting, while Chuck was on the program of the Southern California meeting.

★ ★ ★

John Hughes of our California Unit appeared before the 16th District Coast Dental Society on "Cavity Preparation and Pulpal Therapy for Primary Teeth," while Ed Mack of the same Unit was guest lecturer before the Yosemite District Dental Assistants Society. His subject was, "How to Manage Children in the Dental Office."

★ ★ ★

Dr. James H. Inglis was appointed clinical instructor in Pedodontics at California's College of Physicians and Surgeons School of Dentistry. Dr. Inglis received his D.D.S. degree of the University of Minnesota in 1941, completed a year's graduate work under the Carnegie Foundation Fellowship at the University of Minnesota, and later served with the U. S. Navy, retiring with the rank of Lt. Commander. He now has a practice at Palo Alto, California, doing mostly dentistry for children. ★ ★ ★

Gordon Rovelstadt, associate of George Teuscher at Northwestern, has been appointed clinic administrator of the newly associated dental clinic of Children's Memorial Hospital, Chicago. The clinic provides dental services for youngsters confined to the hospital for treatment of cardiac, diabetic and orthopedic troubles, as well as youthful victims of other diseases. ★ ★ ★

There was a lot of good sense and advice to dentists in the editorial "Dental Health in Children" in a recent "Fortnightly Review," of the Chicago Dental Society.

★ ★ ★

Phil Blackerby of our Michigan Unit, appearing on the program of the North Carolina State meeting in May, speaking on "What Lies Ahead." ★ ★ ★

Our erstwhile evangelist, Walter McFall, assumed the office of President of the North Carolina State Dental Society at its Annual meeting in May. Good luck to you, Walter, and now that you're at the helm, we'll probably see that absence of material on Pedodontics we noticed on the State program this year, corrected ★ ★ ★

Sam Harris, of our Michigan Unit, founder of this Journal and of the A.S.D.C., was featured on the program of the Missouri State meeting in April, speaking on "Active All Day Profitable Practice with Children." Sam's talents as a platform personality are recognized by his many associates in Detroit Speakers circles, where he will head up a newly organized Unit of the local Dale Carnegie group. Good boy, Sam!

★ ★ ★

Paul Sydow, of our Massachusetts Unit, spent a few weeks with the Mel Noonans in Northern Michigan. Paul sorta went strong for one of the local Indian maids, but couldn't ask the question in the language of the Chippewas, so he's still a bachelor, and will be able to do a good job on the assignment Mike Cohen has for him!

★ ★ ★

Elsie Schildwachter and husband Ken Lewis plan to vacation before the San Francisco meeting, and Elsie is staying over for a short post-graduate course after the A.D.A. meeting.

The official family of the A.S.D.C. should have an addition to its ranks about the time you receive this issue. Earl and Carol Lampshire are expecting circa September 1st, and to them and their progeny, we wish the best of luck and health!

★ ★ ★

Frank Tuma, program chairman for Cleveland's 1950 Children's Dental Health Day, sailed from home to Algonac, Michigan in July, stopping enroute to have dinner with Editor Al in Detroit. Frank's companions on the trip certainly kept him in line for you, Mrs. Tuma, even tho' he did serve potent cocktails on the boat, prior to dinner!

★ ★ ★

Pat Lyddan, of our Kentucky Unit, confessed to Henry Wilbur that he was very proud of that baby girl of his, who arrived early this year. Seems as though Pat is already grooming her to be his hygienist! Let's hope he has better luck at directing his child than his fellow-dentist Maureen Bolton, whose daughter just finished her freshman year at University of Kentucky School of Medicine—not Dentistry—as Maureen was hoping! (Editor's Note—Still wearing sharp, tricky hats, Maureen?)

★ ★ ★

Well, it's no longer Batchelor Bill St. John — and the lucky girl is Madeline Launey, a Flemish girl who completely "reformed" Bill's ideas of the virtues of celibacy! Married Saturday June 25th, Bill and his bride honeymooned in Colorado, then returned to Chicago where they will live, and Bill will continue his work at Northwestern.

★ ★ ★

Jerry Timmons, Dean of Dentistry at Temple University, tells us that Ernie Ritsert now has an enlarged Children's Clinic at that school, with 24 chairs now in use and a possible 10 more available in the orthodontic section. Elizabeth Beatty, John Felice and Herb Foster comprise Ernie's staff.

★ ★ ★

Our Cuban associates were gracious hosts to George Teuscher, who put on a two-weeks course in Pedodontics for them during July. George had a wonderful time, despite the terrific heat, and like Mott Erwin, has nothing but nice things to say about our friends in Habana.

★ ★ ★

Dave Law has taken over the Department of Pedodontics at the University of Washington, John Brauer's erstwhile assignment. Congratulations, Dave, and we hope you'll still find time to keep that boat of yours in the water.

★ ★ ★

Among the A.S.D.C. members who attended the American Association of Dental Schools meeting at Chicago in June were the following:

Maury Massler, Univ. of Illinois.
John M. Frankel, Marquette Univ.
Ruth Martin, Washington Univ., St. Louis.
W. R. Wolfe, Univ. of Louisville.
Elsie Gerlach, Univ. of Illinois.
Harold Addelston, New York Univ.
Marshall Snyder, Univ. of Oregon.
David B. Law, Univ. of Washington.
Gordon Rovelstad, Northwestern.
Ralph McDonald, Indiana Univ.
A. J. Malone, Univ. of Illinois.
L. S. Pettit, Ohio State Univ.
Charles Hatch, Forsyth Infirmary.
Kenneth Wessels, Univ. of Iowa.
L. B. Higley, Univ. of Iowa.
Roy W. Adams, Emory Univ.
Frank Lamons, Emory Univ.
Robert O'Neil, Zoller Dental Clinic.
O. W. Brandhorst, Washington Univ., St. Louis.
Robert Carroll, Loyola, Chicago.
Arthur Gabel, Univ. of Pittsburgh.
K. C. Marshall, St. Louis Univ.
Alfred E. Seyler, Univ. of Detroit.
John C. Brauer, Univ. of Southern California.
Charles Freeman, Northwestern Univ.
J. R. Ring, Washington Univ, St. Louis.
B. S. Bibby, Rochester, N. Y.
O. J. Marshall, Chicago College Dental Surgery.
C. W. Hagan, Univ. of Pittsburgh.

Henry Wilbur was Chairman of the Conference Session on Dentistry for Children which featured a panel discussion, "Should the Teaching of Dentistry for Children be

Completely Separated from Other Departments of the Dental School?" The members of the panel were: Ruth E. Martin, John Frankel, Maury Massler, L. S. Pettit and William R. Wolfe.

★ ★ ★

That super-efficient secretary of our New York Unit, Hugh Keenan, reports that their Annual meeting was a great success, with 130 people present for the dinner and many more attending the table clinics. Dean Wright's address at the meeting appears elsewhere in this issue.

Officers elected are as follows:

President . . . . . Joseph J. Obst, Brooklyn
President-elect . . Harold Bowman, Rochester
Vice-President . . . . . Amos Stiker, Addison
Secretary-Treasurer (re-elected) . . . .
Hugh A. T. Keenan, Corning

★ ★ ★

Please address items for this section to the Editor at 14615 E. Jefferson Avenue, Detroit 15, Michigan. Stan Brown has temporarily turned over this work to us.

Al Seyler.

Don't Forget
To Attend
Our
National Meeting
at
San Francisco
October 15 and 16
1949

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Pedodontics and Its Relation to Dental Education

DEAN WALTER HENRY WRIGHT
New York University, College of Dentistry

Dental education has been slow to recognize Pedodontics as a part of the dental curriculum and to appreciate the true nature of the training which this division of dental health service demands. Dental health for children poses problems, studies and services which do not conform to the age long pattern of dental health for adults, and it cannot be taught effectively without new concepts and objectives.

Restorative Pattern in Dentistry

American dentistry has gained an enviable reputation through the excellence of its restorative service. While this pre-eminence of restorative dentistry has elevated American dentistry it has tended to obscure other and equally important approaches to dental health and it may have contributed to neglect of dentistry for children. We have been so concerned with dentistry for adults that the dental health of our children has been regarded as of secondary importance. This neglect on the part of the profession has caused many people to regard dental caries as an inevitable and natural ailment of childhood which can be treated effectively and economically by the extraction of the primary teeth. Failure on the part of dentists and parents to understand the important role of the primary teeth has

1) deprived children of necessary dental care;
2) required them to wait until the permanent teeth have become diseased before they can command the serious attention of the dentist; and,
3) retarded health education among children where it would be most effective.

The restorative pattern which has been followed in dental care for adults has dominated dental care for our children, and has led us to neglect prevention which is the only reasonable means to dental health for children of the present and adults of the future. If we are serious in our efforts to bring dental diseases under control, we must realize that the restoration of teeth alone is a hopeless approach to this problem. Like a mirage, dental health will continue to recede before our most rapid advances in restorative dentistry. Under modern modes of living and dietary patterns, dental deformities and diseases are increasing far beyond our ability to bring them under control by restorative treatment.

Dental Caries and Prevention

Dental caries is a widespread disease in our nation. It has increased until it has become a permanent epidemic. No one knows what suffering, secondary diseases, malocclusion, deformities, and systemic and psychologic disturbances result from dental caries among ninety per cent of our children. This prevalence of dental disease calls for a shift of emphasis in our approach to this problem. We are accustomed to regard dental caries as our most important problem, but this approach has tended to increase our dependence on restorative means in our conquest of dental disease. Now we are becoming aware that *prevention* is our most important problem. If we focus our attention on prevention, we will be able to make progress in our fight against disease. It will enlist resources for an attack on dental disease from many, instead of from one angle. With prevention as our goal, we will act before the teeth have become diseased. We will consider cause first and caries second. Lifting our eyes from the cavities in teeth we will become aware of the abyss in our knowledge and practice of prevention and we will be compelled to do something about it. If we continue to neglect the importance of prevention, the public will continue to be of little help in the control of dental disease. If however, the

*Presented before the N. Y. Unit, A.S.D.C. May 11, 1949.

dental profession inaugurates an effective program of prevention, the public will soon become interested in and helpful to the profession in promoting community projects leading toward this desirable objective. Only through such a challenging program will the resources and personnel of the community be enlisted in an all-out effort to bring about widespread dental health.

Dental Health

Dental health is not widespread among either children or adults. Only rarely do we find a small group of our population enjoying a fair degree of dental health. Such fortunate groups may have had the benefit of a favorable dentist—patient ratio of 1 to 500, for example, in the armed forces during the late war, or they may have lived in geographic areas where the community water supply contained flourine, or in an institution where dental disease was reduced through experimental control of diet and other agents. With a national dentist-patient ratio of 1 to 1,800 and local areas with only 1 dentist to 4,000 population, dental health must suffer. It would require 140,000 dentists, twice the number now available, to maintain a ratio of 1 to 1,000. We cannot expect to graduate more than 3,000 dentists annually with present educational facilities, nor can we prevent the loss of approximately 2,200 dentists annually. With an increase of less than 800 dentists annually, it is impossible to control dental disease by restorative measures.

The situation is not hopeless, for dental records of children in Norway during the recent war show that there was a marked decrease in dental caries and dentists were able, for a short time, to bring this disease under control. This decrease in dental caries accompanied a restriction of the diet, notably a per capita decline in the intake of sugar. After the war, however, when sugar was again available, an increase in sugar consumption was followed by a marked increase in dental caries.

Nutrition

Dental caries is only one of the factors influencing dental health. There appears to be increasing deformity of the dental arches associated with malocclusion, malalignment, and maleruption of the teeth. The demand for treatment of dental deformities greatly exceeds available orthodontic service. While hereditary influences play their part, we cannot ignore the effect of marked changes in our diet. If function plays a part in the development of the jaws, we may expect continuing and more marked deformities in the human masticatory mechanism. There is little need for the chewing of food today. It remains to be seen what will come of the swallowing of unchewed, highly refined, soft, or liquid foods. Although life can be maintained by such foods, the changes through loss of normal function may be accompanied by increased deformity of the jaws and teeth. Zappler's[1] report on the Fifth International Congress of Pediatrics stresses the importance of nutrition. Attention was given to the need for a well balanced diet for pregnant women. X-rays show that development of bones and teeth was good when the maternal diet met the requirements of calcium and protein. Where these were deficient, development was retarded. Lack of Vitamin A was shown to be related to a higher incidence of respiratory infections and higher morbidity and mortality rate, especially among artificially fed infants. Vitamin B was held necessary for proper growth, development and healthy state of the soft tissues of the oral cavity. Riboflavin deficiency was held responsible for short mandibles and cleft palates in rats born of rats that had been raised and bred on diets deficient in riboflavin. These indicate that prevention antedates birth.

Pedodontics in the Dental Curriculum

Dentistry for children, instead of being neglected, should become the foundation of dental education. It is understandable why some enthusiastic teachers of Pedodontics have said that the dental curriculum consists of dentistry for children and the rest of dentistry. There may be more than a grain of truth in this statement. Pedodontics and Orthodontics together with an intensive program of prevention and research, without doubt, will become the axis around which dental education of the future will revolve. Such a course would emphasize embryology, heredity, eugenics, growth and development,

anatomy, physiology, chemistry of nutrition, prenatal care, diet, education of child and parent, immunology, caries inhibitors and epidemiology. These should be supplemented with adequate training in the most advanced treatments available to the child patient.

It is advantageous to provide separate quarters and facilities for the clinical treatment of children. Such separation makes it possible to provide the necessary equipment, teaching material, including visual aids, and in addition, it focuses attention on dentistry for children and elevates this service in the mind of the student. Association with teachers who are enthusiastic about the dental health of children tends to create a wholesome respect for this department. Equality with other courses may be attained by requiring credits and quality grades identical with those in other clinical departments. The course must prepare the graduate to treat children in his own practice. He should be capable of explaining to parents the need of dental care for their children and the part that parents must play in a program of prevention. He should be able to give practical advice on the essential items in prenatal care as related to dental health. He must be indoctrinated in prevention and should be trained to administer all recommended methods of treatment toward that end. His knowledge of dietary and hygienic measures should be practical in nature and helpful in patient instruction. In the field of restorative dentistry, he should be proficient in examination, diagnosis, and treatment planning, local anesthesia, fillings of various materials, treatment of pulps, space maintainers, and oral hygiene. Above all he should know how to handle the child patient and he must develop respect for the far reaching benefits which his service may bring to children. Lastly, he must know that his service will bring him into the mind and heart of the people of the community and that he must be able to assume the duties and responsibilities which such public acceptance implies.

This approach to education in Pedodontics will broaden the student's viewpoint. In addition to his proficiency in providing restorative treatment, he would be competent to employ preventive measures as they become increasingly effective in controlling dental diseases and deformities. His objective would be prevention, and toward that end he should be fully qualified to take his place as a leader and an advocate of prevention in his community. Such an attitude would gain not only the confidence, but also the assistance of the public in promoting long range plans for dental health, and in providing a more wholesome and cooperative spirit among all agencies which labor for community welfare. The great objective would be to gain the student's allegiance to prevention. This would require an impelling vision of a new generation, freed of the ravages of disease, and an imagination to see the dental profession as the guardian of the oral health of the people and not a slave on the treadmill of increasing oral disease.

To ignore dentistry for children in the dental curriculum is to close the door of dentistry to the future. Such neglect would doom our civilization to increasing dental diseases in the midst of scientific advancement which in the future would be more fully dedicated to life and health. It is not surprising that children should become the center of our aspiration and hopes for dentistry of the future. Long ago this truth was expressed in the well known words: "and a little child shall lead them." They are leading and they will continue to lead us to our destined goal—prevention. With the faith and hope of these little ones, we should be able to conquer dental disease and to bring in the new era of prevention within the next generation.

Attend the National Meeting

A. S. D. C. - San Francisco - Oct. 15-16

UNIT NEWS

Editor's Note:

With this issue we are inaugurating a new Section of our Journal, to be titled for the present "Unit News." Mel Noonan, a member of the Michigan Unit, will prepare this feature regularly, but he'll be dependent upon the editor or secretary of each Unit for his information, so we'd like to suggest that Unit Presidents appoint an active correspondent to get the news to Mel immediately after each Unit meeting, or even before each meeting if desired. Although this feature is intended for Unit activities news, personal items may be included and we'll separate them for the Around the Country Column, where indicated.

Let's get behind Mel, and see that each Unit gets publicity for its activities!

A.E.S

Illinois

All the dentists of Illinois should be proud of their newly organized state unit of the American Society of Dentistry for Children, which held its first official meeting May 8, 1949, at the Jefferson Hotel in Peoria, in conjunction with the annual session of the Illinois State Dental Society.

Officers were elected as follows:

President ..... William St. John
Vice-President ..... Robert O'Neil
Treasurer ..... Gerard Casey
Secretary ..... Dayton Berk
Editor ..... Stanley Korf

Jack Burrell was appointed as a member of the Executive Council. Plans were formulated for analyzing the needs of Illinois' dentists and organizing a program to enable them to do more and better dentistry for children.

A.S.D.C. is proud of its newest offspring!

★ ★ ★

Minnesota

The Minnesota Unit held its last meeting at the Coffman Memorial Union, Minneapolis, May 18, 1949. The following officers were elected:

President ..... Gordon S. McEachran
Vice-President ..... Robert Elliott
Secretary ..... Allen D. Petersen
Treasurer ..... J. V. Borsch

Dr. Harold Wittich who founded this Unit almost 20 years ago presented his premier showing of the D.M.F. rate of 746 children ages 3 to 11. Information about the average D.M.F. rate as compared with a rampant D.M.F. rate will be published soon by Dr. Wittich.

★ ★ ★

Michigan

During the Spring election, the Michigan Unit was unable to find a more proficient group of officers than they had, so they re-elected the same men for another year!

President ..... Joseph T. Hartsook
Vice-President ..... Harold Maxmen
Secretary-Treasurer ..... Roy Brooks

Last year President Hartsook appointed a new committee called the Professional Relations Committee, which had as its objective the presentation of men qualified in Pedodontics as clinicians to out-state dental societies, for their regular meetings. The plan was a definite success, and Joe has decided to continue the Committee's activities as one of the best and practical methods of bringing dentistry for children to the smaller or less affluent groups of dentists.

Diagnosis and Treatment Planning for the Juvenile Patient*

MORRIS KELNER, D.D.S.
Philadelphia, Pa.

Editor's Note:

Morris Kelner's accompanying article is written pretty much as I imagine he presented it to his audience last October. It is serious, high-minded and bespeaks a lot of effort on his part, although it seems to us he didn't treat the theory of diet regulation in regard to lacto-bacillus acidophilus count procedures very comprehensively in the paper. (We here in Michigan feel that the flora of the mouth can be changed by proper diet and regimentation of diet procedures.)

Morry recently moved to new offices in Philadelphia, and has as a hobby in his business office, the photographs of men prominent in pedodontics in this Country. He confines his practice to dentistry for children, and is an active member of our Pennsylvania Unit.

A.E.S.

This paper is directed principally to certain members of the dental profession, in respect to their philosophy and attitude towards Children's Dentistry. It is my sincere hope that these practitioners, upon hearing or reading this paper, will resolve to practice children's dentistry on such a level as it fully merits. I am aware that the thoughts that are about to be presented can be best applied to a practice that is limited to children's dentistry. However, I feel certain that the basic principles of this paper can be employed in almost every dental office. If only a thought or two would take root in the minds of these practitioners, I am certain that the service they will render will be more complete. This would benefit the child to a greater degree and would also enable the dentist to gain additional economic benefits from his chosen profession.

It might be wise at this point to re-emphasize two salient but sometimes forgotten points:

(1) Dentistry for the growing child is not necessarily a miniature prototype of dental treatment as rendered for the adult.

(2) Juvenile dentistry certainly does not imply dentistry performed in a juvenile manner.

Brauer, in the preface to the second edition of his book entitled "Dentistry for Children," offers the following definition: "The science of pedodontics has for its aims and objectives the guidance of the primary and the young permanent dentitions in growth and development, as well as the preservation of the health and functional integrity of the teeth and their surrounding structures."

In treating the juvenile mouth, our objectives should include the following:

1. The elimination of all foci of infection.

2. The repair, if necessary, and the retention of all of the primary teeth until normal exfoliation.

3. The consideration, and, if possible, the correction of, any variation from the normal of the developmental pattern of the permanent teeth as revealed by the roentgenograms.

4. The prevention, if possible, of any incipient malocclusion.

5. A comprehensive caries control program including prophylaxis, Sodium Fluoride therapy, diet control, and the use of an ammonium urea (carbamide) dentifrice.

6. The conditioning of the child to be a good dental patient.

*Read before the Pennsylvania Unit of the American Society of Dentistry for Children, Philadelphia, Pa., October 18, 1948.

Just as the sculptor endeavors to create by careful molding and shaping a lovely image, so can we in Children's Dentistry endeavor to help nature in the growth, development, function, health, and esthetics of the child's dental mechanism, facial appearance, and general well-being.

To discuss every conceivable condition that may be encountered in a child's mouth, would consume countless hours. I intend to review only those conditions that are most frequently seen.

In discussing diagnosis and treatment planning for the juvenile patient, let us first pause for a moment and consider the parent and his or her philosophy towards the child's mouth. When children come to the office seeking dental treatment, they are almost always accompanied by one or even both of the parents, so why not start our diagnosis and treatment planning with an analysis of the parent? Tactful questioning will reveal the parent's attitude towards children's dentistry. Are they aware that a premature loss of one or more primary teeth may lead to a future malocclusion and its subsequent consequences? Are they aware that a mutilated mouth will seriously impair the child's masticatory apparatus, and perhaps lead to a state of malnutrition despite the best of foods? Are they aware that the permanent dentition is in the process of development within the jaws? Are they aware of the value of x-rays and study models together with a careful visual examination, as the only positive means of intelligently understanding a mouth? Are they aware that modern dentistry, through painstaking research, has advanced to such a degree that the control of caries is fast becoming a reality? Are they aware that a child, if handled properly and intelligently, can be developed into a splendidly cooperative patient that will not only permit the dentist to render whatever services may be necessary, but will look forward to future dental appointments? Most parents strive to give their children the best of everything, and if made to realize the broad scope of proper and complete children's dentistry, will not only be willing, but anxious to have their children receive the full advantage of modern dentistry.

Almost every normal child from about three years of age and older can be conditioned and developed into an excellent, cooperative, and very enjoyable patient. About 80% of these children will require only intelligent handling. The other 20% are frequently blamed for the lamentable attitude of various dentists toward children and their required dentistry. These children, most certainly, can be conditioned to be cooperative, if only the operator would assert himself as master of the situation, and remember to treat the child as the intelligent individual which he really is. It is not my intention to dwell on child management, but if dentists would only try to better themselves in pedodontic handling and procedures, as they are always doing in other phases of dentistry, dentistry for children then would no longer be the bane of their dental careers.

An intelligent case history is a prudent means of beginning and is of invaluable aid in our diagnosis and treatment planning. This might include the child's physical, as well as chronological age, prenatal history, whether he was breast fed or bottle fed, whether his diet during infancy was controlled by a pediatrician, the age when vitamin therapy was started, the chronology and difficulty of teething, the age when the toothbrush was first introduced, present oral hygiene habits, a brief medical history, especially of exanthematous diseases, what medication and vitamin therapy is currently being administered, pernicious habits, dental history of other members of the family, previous dental experiences of the child, and last, but not least, the present complaint.

A careful and detailed visual examination of the mouth as a whole should be our first concern in any examination. The color of the mucous membrane of the lips should be noted, as well as the presence or absence of herpetic ulceration. The commissura of the lips, if fissured, can be indicative of a vitamin B complex deficiency. The tongue should next be noted. Is it freely movable and is it of normal size? Are there any unusual manifestations of the papilla indicative of a nutri-

tional imbalance? The buccal vestibule and the frena should then be examined. The upper labial frenum should merit special consideration. On occasion, the inferior border of this muscle will extend between the central incisor teeth, and will attach itself into the median lingual papilla. This may lead to a diastema, and serious consideration should be given to a possible surgical correction. However, an orthodontic opinion should be sought before rendering a decision. The occlusion and alignment of the teeth should now come under careful scrutiny. Should there be evidence of a malocclusion, especially a crossbite or an open bite, orthodontic correction may be indicated. If there has developed a protrusion of the anterior maxillary segment, because of a pernicious habit such as thumb sucking, and if the usual methods of correcting this habit have failed, it may be advisable to construct an appliance that would extend across the palate, which would tend to overcome this habit. The periodontium and especially the interdental papillae should then be examined for any pathognomonic manifestations such as fistulae, endocrinopathic symptoms, etc. The crowns of the teeth are now carefully examined. The enamel should be checked for color, translucency, hypoplasia, unusual formations and decay. The presence or absence of spacing between the teeth in the growing jaws should be noted.

In examining a mouth for carious involvement, a full mouth roentgenographic study is of paramount importance. There are many men who rely principally on bite wing studies for their roentgenographic findings. However, since they will provide only a limited amount of information, I feel that a full mouth study of at least ten films should be utilized. The regular size periapical or size "O" films may be used, depending upon the size of the child's mouth. These studies will reveal not only interproximal caries, but also the extent of resorption of the primary roots, the presence or absence of the permanent tooth crypts, the position of the developing tooth crypts in relation to the primary roots, the presence of supernumerary teeth, evidence of necrotic processes such as granulomata, cystic formations, etc. Previously inserted restorations can be examined for overhanging margins, proximal contacts, and the presence or absence of linings for pulpal protection.

If the roentgenograms reveal the presence of any necrotic processes or of other abnormalities, serious consideration should be given for their correction. Extraction or root therapy should be considered if there is evidence of any pathological manifestation around the roots of a tooth. After careful evaluation, if extraction should be decided upon, the utilization of a space retaining appliance, and its merits in the prevention of a mal-occlusion, should be considered. If the insertion of a space retaining appliance is deemed advisable, it should be inserted as soon as possible. Hopelessly decayed teeth or retained and decaying roots do not act as space retainers. They should be removed because of the loss of proximal contacts, and the subsequent mesial drifting of the posterior tooth or teeth. However, should one attempt to maintain the tooth by the use of root therapy, serious consideration should be given to the general health of the child, the length of time the tooth can serve in the mouth until normal exfoliation, the general condition of the mouth as a whole, etc.

If the roentgenograms reveal evidence of cystic growth, supernumerary teeth, or other abnormalities, consultation with an orthodontist, an oral surgeon, or both would be indicated. In the presence of supernumerary teeth in the mouth of a child three or four years of age, judicious judgment would call for no radical procedures until it has been proven conclusively that there is, or will be, interference with the normal exfoliation and eruption of the teeth.

Should there be evidence of uneven resorption of the roots of a primary tooth, extraction may be indicated to prevent the eruption of the permanent successor in torsiversion. The roentgenograms are of immense value in accurately determining the extent of penetration of the carious lesions toward the pulp. With these findings, we can usually determine whether or not the pulp has been involved, and whether merely a protective lining, pulp capping, pulpotomy, or even

pulpectomy would be indicated prior to the insertion of the final restoration.

Fillings with gingival overhang should either be corrected or replaced, as these will lead to gingival irritation, and may also predispose sub-gingival decay and in some instances, may even cause pathologic root resorption. In the mouth which presents throughout a picture of tight proximal contacts, any restoration with inadequate contact, as revealed roentgenographically or clinically, should be replaced, since this might lead towards a mesial drifting of the posterior tooth or teeth.

In addition to ample roentgenographic studies, a clear mirror, a fine sharp explorer, and a good operating light are prime requisites for a thorough and careful examination for caries.

Hyatt's concept of Prophylactic Odontotomy, when carefully adhered to, would call for the correction of any fissure or other break in the continuity of the enamel which may catch the explorer.

A careful interproximal examination of primary molars is more difficult to accomplish than that of permanent teeth, simply because of their broad, flat contacts, and the usual small occluso-gingival distances. Particular attention should be given to the contact between the upper primary cuspid and the first primary molar. Frequently, the contact point between these teeth is under the free margin of the gum, and carious involvement may often remain undetected.

Bruxism, and its subsequent abrasion, is frequently seen in children's mouths. This condition is usually indicative of habit, a nervous condition, or the possible presence of Cestoda in the stool. If the abrasion has advanced to such a degree as to jeopardize the vitality of the teeth, remedial measures should be instituted. These may include the utilization of a soft rubber splint, stool studies, consultation with the pediatrician, and perhaps even psychiatric consultation.

Electric pulp testing, although it has been generally accepted as a valuable adjunct in dental evaluation, should not be relied upon to any great degree when applied to teeth in a primary or mixed dentition. A child's imagination may frequently lead to inconclusive findings in our attempts at electric pulp testing for the vitality of the various teeth. The use of a sliver of ice, warm and cold water, or even warm compound, can frequently give more accurate interpretations of the condition of the pulp of affected teeth.

The use of plaster or stone study models made from compound, alginate, hydrocolloid or plaster impressions is an important part of our diagnostic procedure. Vital information can be learned from careful study of these models. Occlusal disharmonies can be more readily detected on these casts than by looking for them in the mouth. The relationship of the mesio-buccal cusp of the upper molar to the buccal groove of the lower molar, and the existence of a mal-occlusion can be observed. The presence of so-called plunger cusps may be noted. These may easily be corrected, to prevent a tilting or even a submersion of antagonistic teeth. The alignment of the teeth, as well as any generalized traumatic occlusion can be observed.

In planning the operative correction of carious teeth, sound operative principles should be definitely followed. Class 2 is the usual type of cavity encountered in the juvenile mouth. If one is careful in his preparation and pays particular attention to the occlusal lock, results will be very gratifying. Proximal cavities on both primary and permanent posterior teeth should always have occlusal locks. The so-called "prayer fillings" are frequently seen. These have been inserted without an occlusal lock, and with retention dependent upon hope and prayer! This type of filling will surely lead to future trouble. Occasionally roentgenograms will reveal unusually large and tentacular horns of the pulp on a carious primary molar. Rather than risk a possible pulpal exposure in attempting to achieve a proximal box preparation, a modified inlay preparation of the Willett type would be indicated. In cases of extensive tooth destruction, the use of a cast crown for complete coverage and maximum protection has proved to be a very satisfactory

expedient. This is indicated especially following pulpotomy or pulpectomy, where three or more surfaces have been destroyed, or where the remaining enamel walls are very thin and brittle. Class 4 cavities on primary anterior teeth, or even large Class 3's, can be restored to a greater degree of satisfaction with the use of either a labial or lingual lock.

An intelligent caries control program should be a definite part of the treatment plan for every pedodontic patient. Lactic Acid Bacillus counts are an idealistic procedure; however, I fail to see how it can help either the operator or the patient to any great degree. The literature has presented voluminous evidence that the extent of dental caries is in direct relationship to the L. A. B. activity, and also that these bacteria will thrive in a sugar medium. The mouth that presents extensive carious destruction shows the results of high L. A. B. activity, and thus the need for a count is not generally necessary. A restricted carbohydrate intake will reduce the L. A. B. activity, and this in turn will reduce the incidence of decay. It can readily be understood that the complete elimination of sugars from one's diet, either child or adult, is a Utopian dream. This can very easily be prescribed, but very seldom practiced. Diet control, however, is but one factor in a caries control program. Good oral hygiene is also of paramount importance. The oral hygiene of the usual child is generally insufficient. Parents should be impressed with the importance of their helping the child with these measures, especially before retiring. The use of an ammonium urea (carbamide) dentifrice may be of some value in caries control and should be given serious consideration. Last, but certainly not least, topical applications of sodium fluoride should be a routine part of every caries control program. The accepted technic of application, becauses of its proven merits, should be meticulously followed. The cutting of corners, and other variations to save time, will only deprive the child of its benefits.

The problem of the fractured anterior tooth could be, in itself, the subject of a lengthy discussion and I shall touch on this rather briefly. These cases should receive our consideration as soon as possible after the injury. If a case presents a near or even a small exposure of the pulp, a sedative dressing should be gently placed over the exposed dentine or exposed pulp. The tooth should then be covered and protected with a well fitting celluoid crown. This may be filled with either zinc oxide, thymol, and eugenol, cement or silicate. This crown form should have an allowance made for an easy escape of the excess material, and should be seated with very gentle pressure. A waiting period of six to eight weeks is usually sufficient to determine whether the pulp will return to normalcy following the trauma, or whether it will start undergoing degenerative changes. Should the injured tooth be loose in its socket because of the trauma, it may be immobilized by wire splinting to the adjacent teeth. If the original injury created a pulp exposure of considerable size, and there is roentgenographic evidence of an incompletely calcified root, pulpotomy can be performed. If, during, or at the end of the six to eight week waiting period, there is evidence of pulpal degeneration, pulpectomy can be performed. If the root formation is incomplete, the pulp therapy should include an apicoectomy. After local conditions have returned to normal around the fractured tooth, it may then be restored with either a porcelain inlay or an acrylic jacket, to maintain its functional and esthetic integrity.

If the trauma has so damaged a permanent anterior tooth that only the root remains, or if there is clinical and roentgenographic evidence of a root fracture, extraction is the only sensible method of treatment. This tooth may be replaced with one of several types of appliances that can readily be made. If a primary anterior tooth has so been injured that it has to be removed, a space retaining appliance need not necessarily be constructed. Mesial drifting of primary anterior teeth is an extremely uncommon occurrence. Therefore, space retaining appliances should be constructed in these cases only for esthetic purposes.

1930 Chestnut Street.